A REPORT ON THE DEVELOPMENT OF AN INSTRUCTIONAL UNIT ENTITLED 'AN INTRODUCTION TO ARCHERY'

WILLIAM CONRAD HEFFERTON

A REPORT ON THE DEVELOPMENT OF AN INSTRUCTIONAL UNIT ENTITLED 'AN INTRODUCTION TO ARCHERY'

by

William C. Hefferton, B.PE., B.Ed.

A Report submitted in partial fulfillment
of the requirements for the degree of
Master of Education

Division of Learning Resources
Memorial University of Newfoundland

November 1979

St. John's Newfoundland

ABSTRACT

The main purpose of this study was to produce a videotape program utilizing the basic instructional aids for beginners in archery. Provisions for progression in competence in the sport geared to the students' interests was also an important consideration. Furthermore, the program was to be tested to determine if the students, after viewing the videotape, would reach certain predetermined levels of knowledge.

'An Introduction to Archery,' the title of the program, was produced at St. Clare's Mercy Hospital, in St. John's, Newfoundland, and dealt with a comprehensive body of knowledge that a beginning archer would require.

The participants of the study were twenty Grade Ten students from Gander, Newfoundland, and twenty physical education majors from Memorial University of Newfoundland. The pretest was administered to the students from Gander and they were then permitted to view the videotape production in total. For the Gander students the viewing was immediately followed by the posttest. In lieu of this test, the physical education majors at Memorial University of Newfoundland were given a reaction questionnaire to subjectively analyze the contents of the videotape and their reactions were tabulated.

Evaluation was attempted in three ways: (i) a *t*-test of dependent means, (ii) a Percentage Analysis, and

(iii) an Item Analysis.

On the basis of the evaluative data a significant improvement from the pretest to the posttest period was evident in all students tested. Also, other investigative techniques, such as, the questionnaire and informal conversation gave further evidence which strongly suggested that demonstration by a skilled instructor on videotape resulted in (i) teaching beginning motor skills, (ii) providing uniformed-controlled presentation, and (iii) in arousing student interest in archery. The results of the project tended to suggest, then, that when live demonstrations by a skilled instructor are not available, video demonstrations are recommended.

ACKNOWLEDGEMENTS

I would like to express my deepest appreciation for the help and guidance provided by project supervisor, Dr. Garfield Fizzard.

Special gratitude is expressed to Dr. Diana Carl, for her assistance and use of St. Clare's Hospital television facilities; Mr. Len Rich, for his archery expertise; and Dr. Frank O'Connor, for his general knowledge of physical education.

Sincere thanks to my fellow graduate students who assisted me with the audiovisual portion of my thesis, also to my mother for her encouragement and devotion.

Finally, I dedicate this thesis to my wife, Donna, and my two children, Shelly and Mark; without their patience and love I would not have been able to even attempt this project.

TABLE OF CONTENTS

APPENDICES Page

LIST OF TABLES

CHAPTER I

INTRODUCTION

This report is an account of the development of an instructional unit in archery, intended primarily to accompany the physical education curriculum in Newfoundland schools. In this chapter, the changes in the physical education curriculum are briefly discussed. A history of archery follows and a case for archery as a modern sport in school curricula is presented.

Physical Education Curriculum in Newfoundland

In 1973 the Department of Education implemented a new Physical Education Program in senior high schools in Newfoundland. The main element of innovation was the introduction of more sports which were suitable, not only for immediate involvement, but for lifelong participation.

Another change in the new curriculum was a shift in emphasis from "team sports" to "individual sports." The former program emphasized such team sports as volleyball, soccer, basketball, and hockey; the new program introduced such sports as weight lifting, cross-country skiing, canoeing, and archery, all of which could be engaged in on an indi-

vidual basis.

The rationale for the introduction of individual sports lay with the changing nature of society. With a large proportion of the population engaged in sedentary occupations, it became increasingly important to provide opportunities for physical activities outside the work place. The increased leisure time available to much of the population had resulted in more opportunities for such physical activities. However, for several reasons, the traditional team sports appeared to be largely inappropriate for life-long participation by a large proportion of the population. First, many of these sports required physical exertion that was too strenuous for elderly people. Secondly, many of these sports required facilities such as fields and courts that were costly to provide for large numbers of participants. Thirdly, the organization of teams could put restrictions on the involvement of large numbers of people. On the other hand, sports that could be engaged in by individuals at their own convenience and skill level, overcame many of the difficulties of team sports and offered more opportunities for physical activity by the whole population for as long as they were physically capable.

As indicated above, one of the individual sports offered in this new curriculum was archery, the subject of this project. In the following sections the history of archery will be reviewed, followed by a discussion of the

features of archery that make it a valuable individual sport.

History of Archery

The origin of the use of the bow and arrow is lost in antiquity. It is most likely that it was first used, not as a sport, but as a weapon for hunting and war. How prehistoric man first devised the bow and arrow, is left to conjecture, although it is perhaps reasonable to speculate that the hand-held club became a throwing weapon, and that thereafter a means to project it was devised, the eventual outcome of which was the bow.

In tracing the development of archery among the earliest primitive peoples, present evidence points to North Africa as the origin. Gillelan (1977) stated that Doctor Saxton Pope, a modern archery pioneer, concluded that bows and arrows were first used some 50,000 years ago in what is now Tunisia. Pope based his conclusion on the discovery in that area of arrowheads which were in existence in the period contemporaneous with the Würm Glaciation, or the last Ice Age of Europe.

According to Heath (1971) the use of the bow as a weapon of war dated as far back as the twenty-third century, B.C. A carved figure showing a hunter with a weapon closely resembling a composite bow is portrayed on a victory stele

of the Akkadian king, Naram-Sin from Susa.

Throughout history, before the invention of gunpowder, archery in war often meant the difference between victory and defeat. The outcome of battles frequently depended on the best military strategy based on archery. For example, archery played a significant part in the victory of William the Conquerer in the Battle of Hastings in 1066, and of Henry V in the Hundred Years War in 1415.

Throughout the Middle Ages many battles were fought and won by the expert marksmanship of the warriors using bows and arrows. However, with the invention of gunpowder in the early 1450's, the use of the bow as a military weapon began to decline.

Archery was probably used as a sports activity from the time it was first used in war, as a pastime or in practice while waiting for battle. Heath (1971) stated that the increase of archery solely as a sport started with the introduction of firearms during the conquest of Constantinople in 1453. According to Heath, one of the objectives of the Guild of Archers formed at that time was to preserve the love of the sport among the people, even after it had been completely abandoned by the army as a weapon of war at the end of the sixteenth century.

Archery as a sport gained further prominence in 1544 when Roger Ascham was commissioned by King Henry VIII of England to write formal procedures for bow handling (Heath,

(1971). The result was a book, 'Toxophilus,' the first written description of the steps to be followed in accurate bow shooting. In 1545, Ascham presented 'Toxophilus' to Henry VIII, who incidentally, was an avid archer. Archery gained popularity as a sport during the reigns of Henry VIII, Edward VI, and Queen Elizabeth I of England, all of whom were accomplished archers.

According to Longman (1894), archery started to decline in 1771, but was revived again in 1781 in Europe, by Sir Ashton Lever, who was first President of the Toxophilites, now the Royal Toxophilite Society. In the United States the revival of archery was started in 1827 by two young gentlemen of Philadelphia, Doctor Robert Eglesfield and Samuel Powel Griffitts. These gentlemen were instrumental in the formation of a successful archery club, the United Bowmen of Philadelphia, in 1828 (Heath, 1971).

Archery began to be accepted in many parts of the world and was included in the 1908 Olympic Games in London, England. Since the Olympic Games of 1908, the sport of archery has grown in popularity in schools and colleges as well as hunting for sport. Today, says Gillelan (1977), archery competition is taking place in more schools and campuses than at any time in the history of the bow.

Archery as a School Sport

Since the early 1960's, archery has been popular in many schools in the United States and Canada, mostly as a part of the physical education curriculum rather than as a competitive sport.

Archery is also growing in popularity in the schools of Newfoundland. It has gained attention in the physical education programs of the schools of the province for several reasons, including the following: (i) it has a lifelong appeal to students, (ii) it is relatively inexpensive, (iii) it is safe, and (iv) it requires strength and skill to participate.

Driscoll (1971) stated that to enjoy archery fully, skilled instruction is essential. Once an individual is familiar with the bow and arrow, and really tries to improve, his enthusiasm and interest will sustain him through the years that follow. According to Driscoll, of those who begin archery, more of those who receive instruction in schools and in local archery clubs go on to advanced levels and at a faster rate than do those who do not receive instruction:

> Some of these youngsters have gone on into competition with those in senior divisions of the sport and have made excellent records for themselves, but, more important, it has given them a lifetime hobby. There is an ever increasing need for trained leaders, for physical education directors with a

> knowledge of archery, and for teachers in camps, colleges, and schools who are accredited archery instructors (p. 5).

If the skills of archery are to be relayed to students, it is necessary for teachers to possess the required knowledge of the principles underlying this sport as well as a basic proficiency in this psychomotor skill. Thus, teacher and student can work together to achieve positive results.

CHAPTER II

NEEDS ASSESSMENT

Introduction

In the teaching of all sports, modelling is important. Psychomotor learning constitutes a large part of learning in sports. In this type of learning, it is especially important that the novice learner should have opportunities to observe the actions of skilled performers in the sport. Through observation of good demonstration, the student is provided with a model to imitate.

Ideally, the physical education teacher should be able to provide the model for every sport he/she teaches. However, most physical education teachers are not sufficiently proficient to be satisfactory models in every sport in the curriculum. This problem is aggravated by the specialized nature of some sports and the appearance of new sports.

Given that the teacher is unable to execute well all the skills of a particular sport, there are at least two ways to have the student observe good models: (i) a student leader may be trained to perform it before the class, and (ii) the teacher may use various mediated programs of expert

athletes demonstrating the skills.

Archery is a sport in which many physical education teachers in Newfoundland do not have a sufficiently high level of competence to provide adequate models. They may, therefore, require assistance in demonstrating proper techniques to their students.

Statement of Needs

Inadequately trained archers among physical education teachers have the following consequences: (i) students do not obtain sufficient guidance in the purchasing of the required equipment, (ii) students do not receive adequate modelling techniques and hence progress is hindered, and (iii) the rapport between students and teacher decreases when there is a lack of direction in the subject.

In the view of the author, there was a need to provide the teachers with instructional materials which would fill the gap in their background by providing the model and basic information required of beginning students.

The author made an informal and oral survey of twenty physical education teachers, fifteen members of the St. John's Archery Club, eleven members of the Gander Archery Club, two recreation consultants and twenty-five students to determine if they concurred with the author that there was a need for instructional materials in archery

in which basic information was given and techniques were demonstrated.

The overwhelming response from the above survey was that there was such a need and they did not have any appropriate existing instructional materials at their disposal.

Alternative Solutions

The author considered three possible solutions to the problem of providing materials for the physical education teacher: (i) to seek and recommend for purchase a list of materials already available, (ii) to adapt existing materials, (iii) to develop an instructional package to meet the needs as experienced by teachers and other physical education specialists.

The first two solutions are preferred, as they are directly and indirectly, less time consuming, and are likely to be less expensive. If neither solution one nor solution two was feasible, the third solution would be adopted.

Survey of Available Materials

The author searched the following sources of literature for archery material which could be used as background for teachers or instructional materials for the students:

(i) Book Review Digest (1905-1978)

(ii) Book Review Index (1965-1978)

(iii) Books in Print (1977-78)

(iv) British Books in Print (1977, 1978)

(v) Canadian Books in Print (1977, 1978)

(vi) Canadian Periodical Index (1938-1978)

(vii) Cumulative Book Index (1928-1978)

(viii) Current Index to Journals in Education (1969-1978)

(ix) Dissertation Abstracts (1938-1978)

(x) Education Index (1929-1978)

(xi) Education Resources Information Center (ERIC) (1966-1978)

(xii) In Review (1967-1978)

(xiii) Quille and Quire (1935-1978)

(xiv) Readers' Guide to Periodical Literature (1900-1978)

In addition, physical education teachers, archery specialists and sports associates were contacted concerning additional information on instructional archery.

The following libraries in St. John's were searched for print materials on archery: Memorial University's Main

Library, Education Library and Physical Education Library, and the Center for Aduio-Visual Education (CAVE); Arts and Culture Library; College of Trades and Technology Library; Instructional Materials Center of the Department of Education; The National Film Board of Canada Library; The City Hall Library; and various other public libraries in the city of St. John's.

As a result of the search and the personal contacts, several books were located. The following were personally examined by the author:

(1) The Archer's Bible by Fred Bear (1968). This book contains a large selection of valuable bowhunting information for large and small game, as well as bow fishing. It is clearly written and has a wide appeal for students who are interested in all aspects of archery.

(2) The Archer's Handbook by The National Archery Association (1968). This book offers suggestions for establishing an archery club and various methods of running a tournament. It is written for the established archery club and would be of little benefit to the beginning archer for instructional purposes.

(3) Basic Archery Manual by Ron Genge (N.D.) This manual is a standard publication of a "how-to-do-it" series with additional features on forming an archery club, advice to the instructor, and includes a comprehensive section on the disabled archer.

(4) The Complete Archery Book by Louis Hochman (1957). This book has bowhunting as its main theme and includes a chapter, "Hunting With Howard Hill," an internationally known archer-hunter. It is interesting, well written, and contains many vivid illustrations.

(5) The Complete Book of the Bow and Arrow by G. Howard Gillelan (1977). This book covers the sport of archery in a complete and thorough manner. It has a large section on bowhunting, with a section on archery careers and a look at the future of archery.

(6) The Encyclopedia of Archery by Paul C. Hougham (1958). All aspects of archery and archery terminology are explained. In addition, this book has an interesting section on the instinctive shooter, that is, one who has the ability to aim and shoot a bow and arrow strictly by instinct.

(7) Field Archery and Bowhunting by Arnold O. Haugen and Harland G. Metcalf (1963). This book also deals with bowhunting as its central theme. It is very detailed in its approach to archery. Each chapter of the book consists of a thorough description of the techniques of archery.

(8) New Guide to Better Archery by Thomas A. Forbes (1960). This book has a section on how to dress and prepare game after a successful hunt. This book would be more suitable for advanced archers, who are especially interested in bowhunting.

The following books were listed in the various selection aids; however, reviews to these books are not available, and within the time frame available for the project, they could not be personally examined by the author.

(i) A History of Target Archery
by Ernest Gerald Heath (1973)

(ii) Archery
by Earl Hoyt (1972)

(iii) Archery
by Edmund Burke (1963)

(iv) Archery
by Wayne C. McKinney (1966)

(v) Archery for Everyone
by John C. Williams (1976)

(vi) Beginning Archery
by Roy K. Niemeyer (1967)

(vii) Better Archery
by Ernest Gerald Heath (1976)

(viii) Better Archery for Boys and Girls
by George Sullivan (1970)

The author searched for information about audio-visual materials in the same libraries as the print materials on archery. In addition, several selection aids were used in search for audiovisual materials:

(i) Audio-Visual Instruction

(ii) National Information Center for Educational Media (NICEM Indixes)

(iii) Previews

The descriptions of the following films were found in the NICEM Indexes:

(1) Archery for Girls. This is a ten-minute black and white 16mm film produced in 1949 by Coronet Instructional Films. It demonstrates stance, nocking the arrow, the draw, the aim, the loose. This film also stressed relaxation and practice.

(2) Archery Instruction and Safety. This is a ten-minute colored 16mm film, produced by Harold C. Ambrosch Productions in 1960. It demonstrates the fundamentals of stance, nocking the arrow, the draw and hold, and release. Also the fundamental safety techniques in the sport of archery are stressed.

(3) Archery Today. This is a twenty-two-minute colored 16mm film, produced by Grayling Film Service in 1968. This film explains, in detailed form, the techniques and methods which should be practiced by the safe bowhunter.

(4) Archery - Aiming - The Pre-Gap Method. This is a four-minute colored 8mm film produced in 1969 by Ealing Corporation. It demonstrates the pre-gap method of aiming in archery.

(5) Archery - Aiming Sight Method. This is a three-minute colored 8mm film, produced in 1969 by Ealing Corporation. It demonstrates the aiming sight method of archery.

(6) Archery - Fundamental Skills. This is a four-minute colored 8mm film, produced in 1969 by Ealing Corporation.

It demonstrates fundamental skills needed in archery.

(7) Archery - Nock, Anchor, Release. This is a four-minute colored 8mm film produced in 1969 by Ealing Corporation. It demonstrates techniques for anchoring, and releasing the arrow.

The 8mm films mentioned above, numbers four, five, six and seven, which were produced by Ealing Corporation, are all silent films.

Rationale for Development of Materials

Print Materials

The books referred to above were considered by the author to be inadequate for demonstration purposes because the instruction was in print form and lacked motion. There are several books, such as, The Complete Book of the Bow and Arrow by G. Howard Gillelan; Paul Hougham's, The Encyclopedia of Archery; and The Basic Archery Manual by Ron Genge, which are valuable assets for the novice archer. However, the books were considered to be inadequate for the modelling function because there was no motion and therefore the students would not be able to imitate the action from words or from still pictures and diagrams in a book.

Films

The films mentioned above were not available for personal examination but were evaluated on the basis of

descriptions from the various sources of information. In evaluating the films the following questions were considered: "Is this medium relevant to the students in that it provides learning experiences both to retain and transmit knowledge? Are skills more effectively learned through this medium as compared to traditional methods? Can all students be reached, and knowledge retained for longer periods of time by using a film on archery?"

In the judgement of the author the aforementioned films were inadequate to meet the needs of the beginning archer. The first two films (Archery for Girls and Archery Instruction and Safety) were considered to be inadequate because they were not long enough to give a complete resume of facts about archery (ten minutes), while the third film (Archery Today) was not applicable because it stressed instructions for the advanced archer, including the bow-hunter. The four silent films (Archery - Aiming - The Pre-Gap Method, Archery - Aiming Sight Method, Archery - Fundamental Skills, and Archery - Nock, Anchor, Release) were considered to be inadequate because they lack sound and interpretation of the film could be difficult. There are no instructional films available which are complete on the basic knowledge of archery for beginning students.

Because of the inadequacy of the available materials, the author concluded that there was a need for the development of instructional materials to deal specifically with

the basic information necessary for beginning archers.

Outline of Development Process

The instructional materials were developed according to the following developmental process:

(i) Needs Assessment

(ii) Learner Analysis

(iii) Task Analysis

(iv) Rationale for Choice of Media

(v) Development Procedures and Formative Evaluation

(vi) Summative Evaluation

(vii) Conclusion, Recommendations, Implementation

The needs assessment has been described in this chapter. In the following chapters the remaining components of the process will be described, as they relate to the development of the instruction for archery.

CHAPTER III

LEARNER ANALYSIS

Overview of Relevant Characteristics

> Learning behavior is a curious and complicated matter which derives its essence from many facets in the surrounding environment (Frey & Haugen, 1969, p. 35).

Learning is dependent not only upon intellectual factors but also upon such factors as maturation, values, attitudes and environment. All of these things are a combination of inherited characteristics and those acquired behaviors which result from contact with the environment. For example, the developmental tasks that children and youth confront in the process of "growing up" determine to a large extent what they consider to be critical learning tasks. Awareness of these facts on the part of the teacher leads to the important process of adjusting teaching methods and materials to meet the students' needs.

In developing instructional material, as in the development of any instructional experience, one should take into account the background of students, including values, attitudes and maturity, as well as academic factors, such as mental age and previous learning.

The instructional videotape, 'An Introduction to Archery,' was designed, primarily, for senior high school students to be used as part of their physical education curriculum and secondarily for beginning archers from age twelve years and older in a recreational setting.

Physical education is a compulsory subject in most secondary schools in Newfoundland, and in some cases it is a credit subject. The videotape is primarily designed for those schools where the physical education program is required of all students. The only characteristic on which any distinction is made on type of program is sex, for example, wrestling for boys and dancing for girls.

Students are assigned to physical education classes according to classification of that particular school. In some schools a heterogeneous classification is used where there are many individual differences--physical, intellectual, social and cultural within the same classroom. Other schools may use a homogeneous classification where all the students are similar within the same classroom; a class of average students, a class of above average students, and a class of below average students. Regardless of the classification used by different schools, physical education classes will have a wide range of ability because the whole school will be participating in the program.

In the development of the instructional videotape, consideration was given to the main characteristics of the

learner. In the following section these factors are described in more detail.

Age

In the experience of the author, there are very few classrooms in Newfoundland with students grouped on the basis of similar ability. According to provincial educational statistics compiled by the Department of Education, the mean age for grade ten students and grade eleven students is fifteen years and sixteen years, respectively.

Sex

Decisions whether a sport is taught to boys or girls are made by the physical education teacher in consultation with the principal. In the development of the videotape, it was assumed that the learner could be either male or female.

Achievement

> In an adolescent social system in which academic achievement is highly valued, those who achieve highly will include more people whose actual intelligence is higher than in a social system where this activity is less valued (Coleman, 1960, p. 337).

Physical education can not only be a medium for some measure of success for most children; it can also be particularly valuable to the child who performs at a lower level

academically. In this case he can achieve a higher measure of success in physical activities.

Inherent in this statement is validity for examining the particular culture of students in relation to their level of achievement. In this way, the teacher can understand the students in terms of their attitudes, values, and emotional and social maturity. There are three levels of achievement to be considered for this project: (i) the range of achievement of the students using these materials would be as broad as the range of achievement of the full student population of the school, (ii) the athletic achievement which likewise varies, and (iii) the archery achievement which is assumed as nonexistent. Thus, this instructional package will be available to all children regardless of their achievement and ability.

From speaking to various physical education teachers in Newfoundland, the author concluded that the level of achievement for beginning students in new sports is quite low. These students, in most cases, receive their first experience in archery in physical education classes at the senior high school level.

Attitudes

These students have a wide range of attitudes toward learning, from the negative feelings of the less academically oriented to the positive feelings of the highly successful

academic. Their attitudes toward archery could only be regarded as neutral based on no prior exposure to the sport. The instructional material presented in this package has been arranged hierarchically so as to be beneficial to all levels of ability described above.

Most high school students have had previous experience with media. They have been exposed to many kinds of audio-visual equipment, from cassettes and records to videotape machines. This experience of being instructed through audio-visual aids will not be novel to them. On the basis of the teaching experience of the author, students display an interest in instruction by audiovisual methods. The results of the reaction questionnaire conducted by the author tend to confirm the above statement (refer to page 63). In addition, the attitude of the students towards physical education is generally favourable for the majority of high school students.

Additional Characteristics

The relationship between students and their teachers will also be varied at this age level. The better the relationship the higher the interest will be. The academically minded students maintain a good relationship with their teachers and in turn are interested in their future.

Inter-student relationships are usually competitive, especially in athletics. While this is essentially healthy, it could present an obstacle in achieving the benefits of archery.

While there are exceptional students in grades ten and eleven, many of them are similar in attitudes, interest and achievement. The main difference exists in their capacity for learning experiences. Learning experiences follow a simple-to-complex and concrete-to-abstract hierarchy which is ideal for the development of a "success syndrome." The statement "nothing succeeds like success" is most pertinent in the area of learning. The acquisition of physical and social skills can increase a child's awareness of his own potentialities and enhance his self-image, which is of vital importance in the development of proper attitudes toward learning.

According to Vannier and Poindexter (1976) these attitudes included: (i) development of motor skills; (ii) understanding of concepts, meanings and generalizations; (iii) motives and interests; (iv) social and emotional control; (v) esthetic appreciations; and (vi) ability to solve problems.

> Readiness to learn a skill is a concept basic to rate and quality of learning. Motor learning readiness is dependent on physiological age, previous learning, and experience and motivation, and is a determinant of what skills can best be learned at a given time (Vannier & Poindexter, 1976, p. 19).

The high school students who demonstrate these proper attitudes toward learning will be able to enrich and develop their skills at a much faster rate than those students who have negative attitudes toward learning.

CHAPTER IV

TASK ANALYSIS

Tasks and Sub-tasks

In developing the skills of high school students, there are many prerequisite factors which have to be considered. For example, as a prerequisite to achievement in archery, the students should have developed basic eye-hand coordination. The process of developing a motor skill can commence from this point. Each step has to progress from the simplest to the most complex movement.

The purpose of the task analysis is to outline the proposed task so that the developer's intentions can be achieved, and this should be broken down in a systematic way.

The tasks and sub-tasks, which are necessary to develop introductory instructional materials for the beginning archery students, are shown in Tables 1 through 4.

Instructional Objectives

Bloom (1966) emphasized that instructional objectives should be clearly and unequivocally stated. He developed a Taxonomy of Educational Objectives with examples and illus-

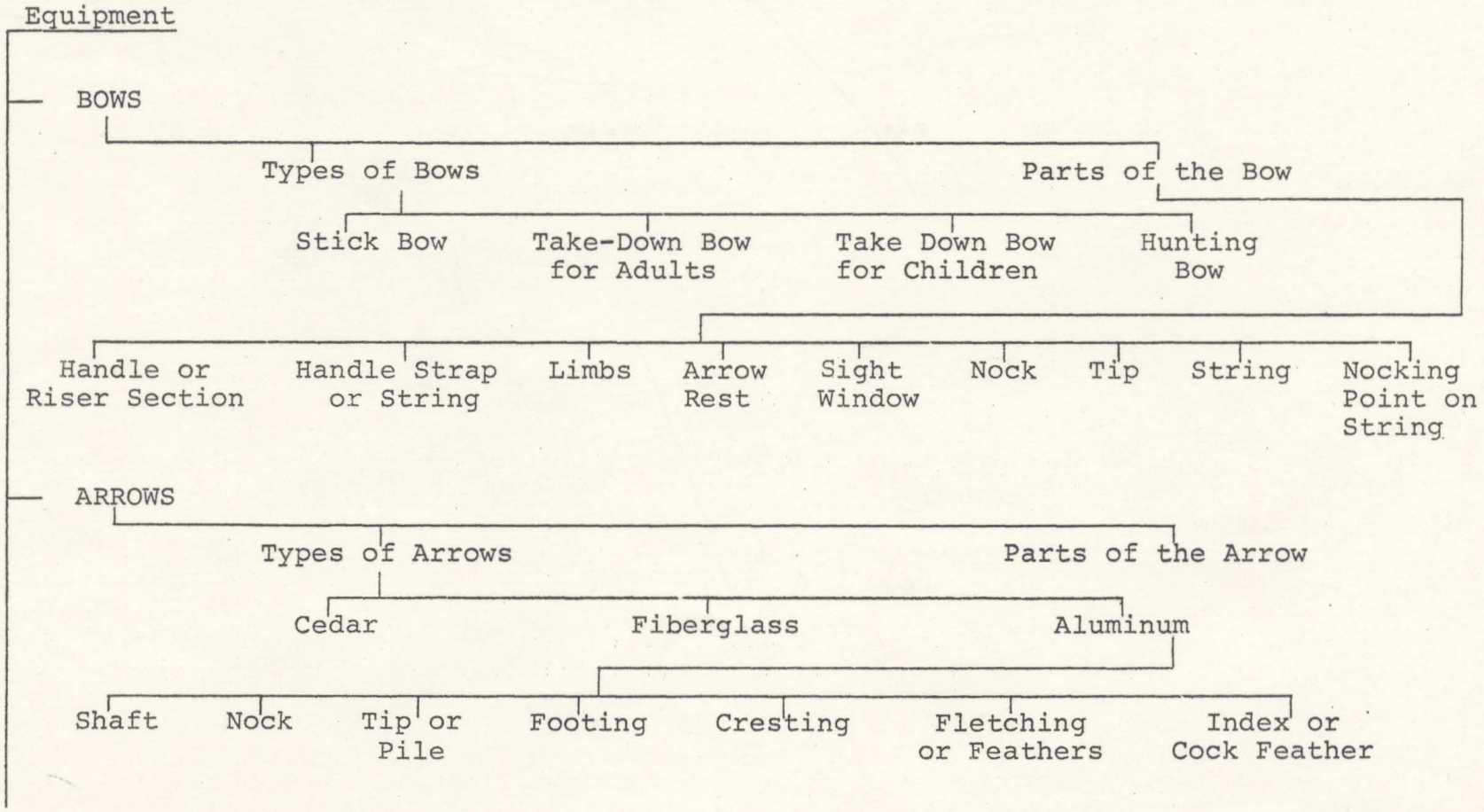
TABLE 1

Task Analysis: Introduction to Archery

Equipment	Basics of Shooting	Basic Techniques
Bows	Stance	Stringing
	Bow Hand	Unstringing
	Bow Arm	
Arrows		Safety
	Nocking the arrow	
		Measuring for an arrow
Finger Tab	Drawing the arrow	
		Proper method used in picking up a bow
	Anchor	
Quiver		
	Holding and aiming	Choosing the correct bow
Arm Guard		
	Releasing	Using the back muscles
	Follow Through	
Chest Protector		Eye Dominance
	Relaxing	

TABLE 2

Task Analysis: Equipment



(cont'd.)

Table 2 (cont'd.)

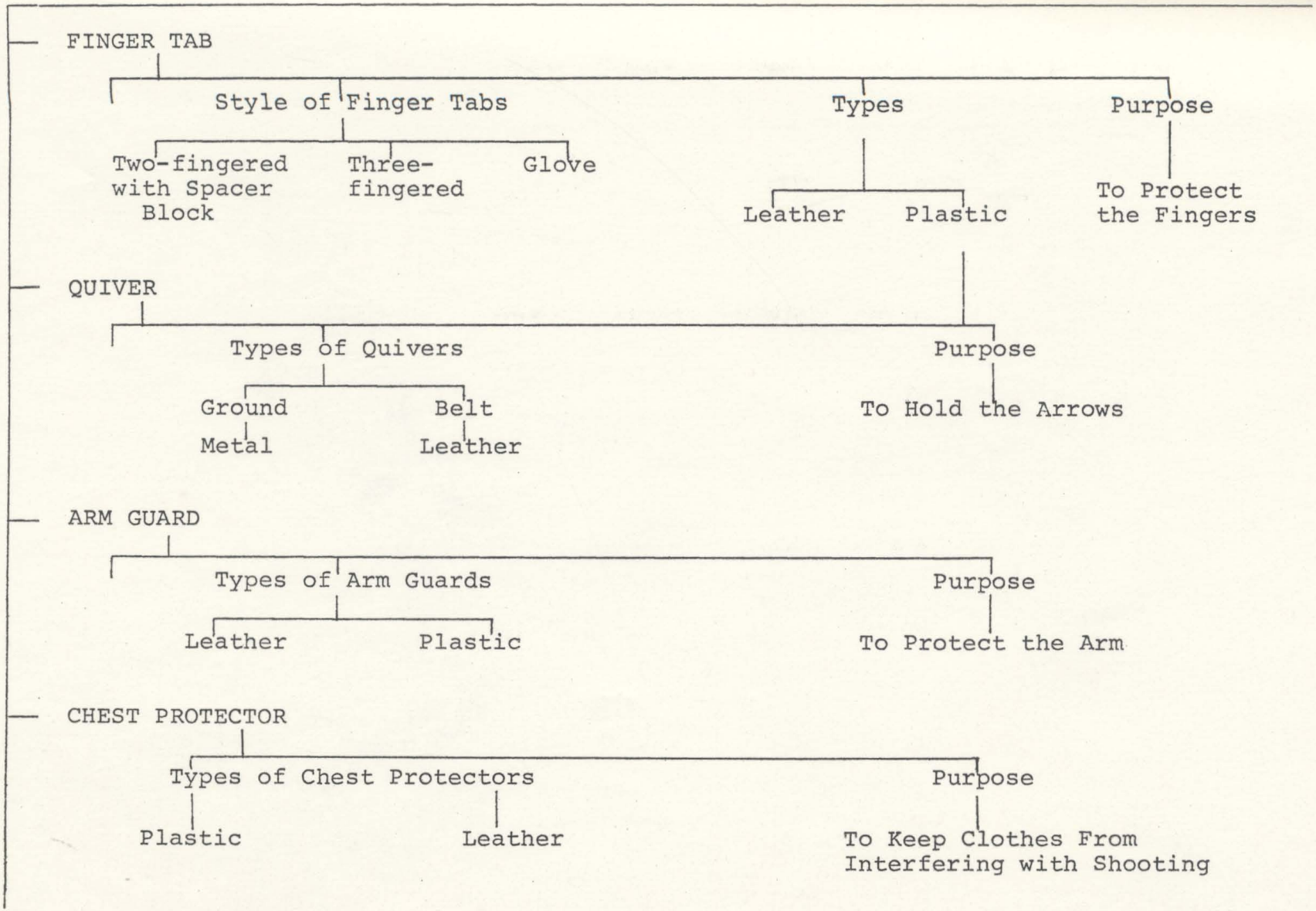
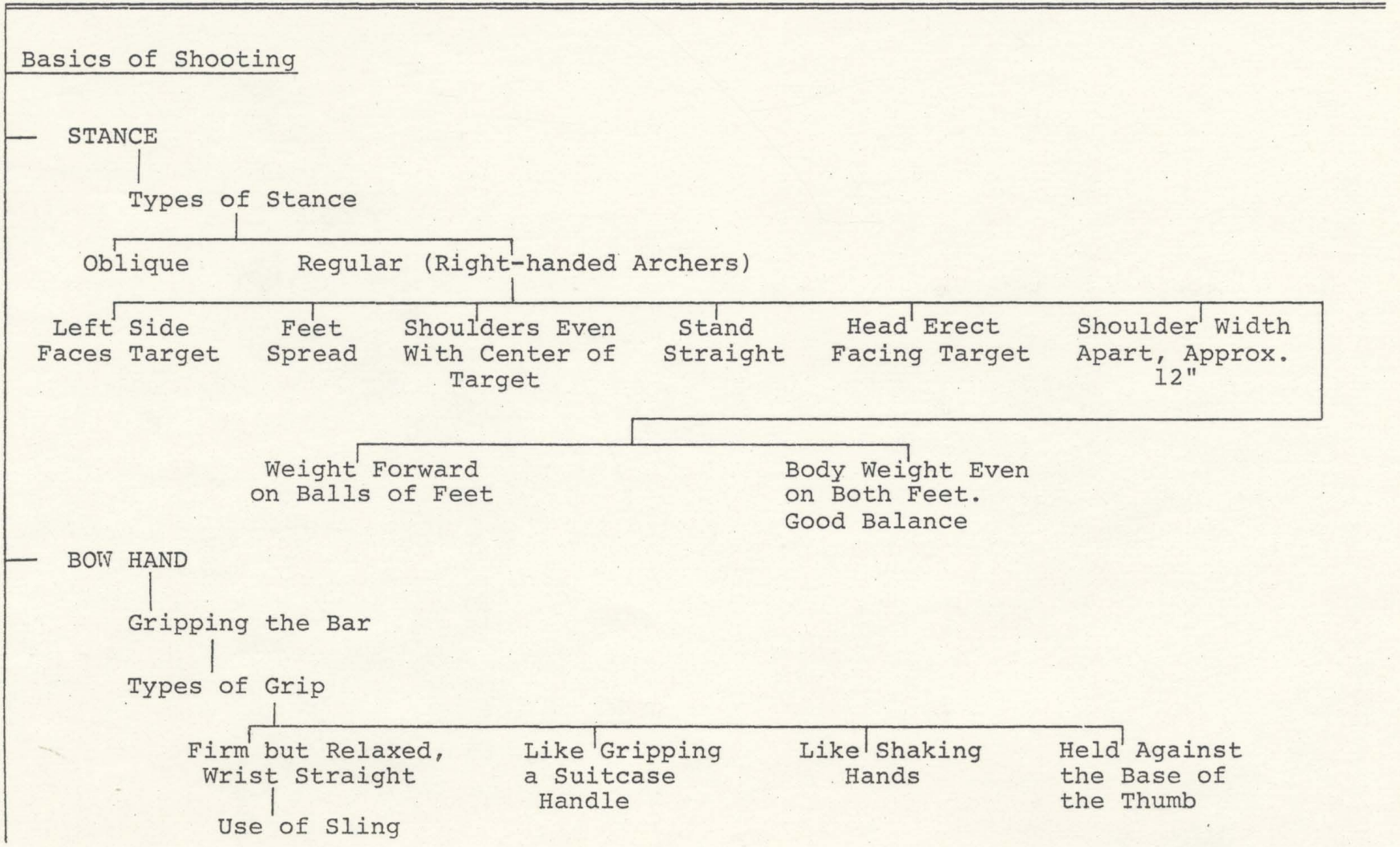


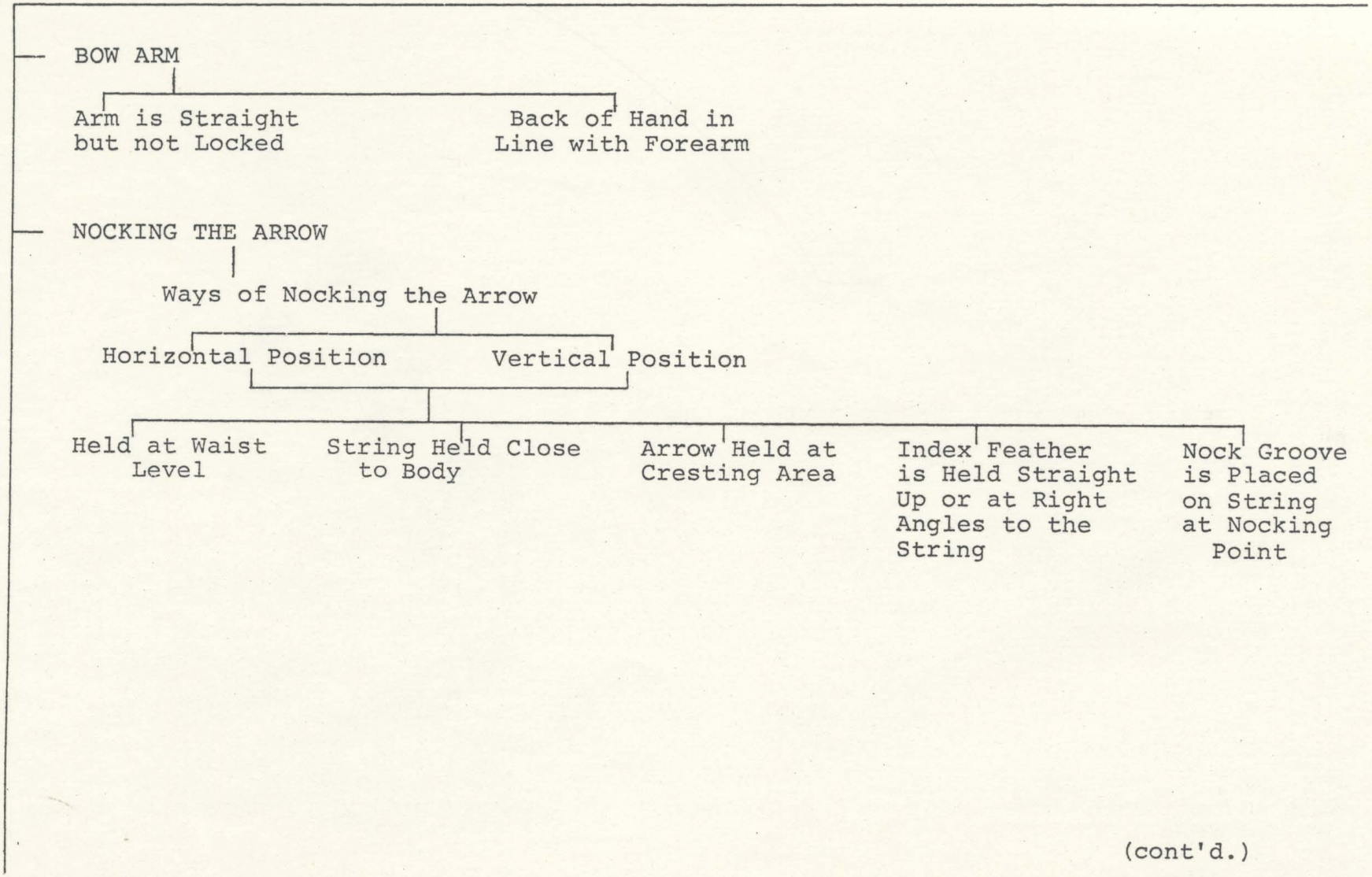
TABLE 3

Task Analysis: Basics of Shooting



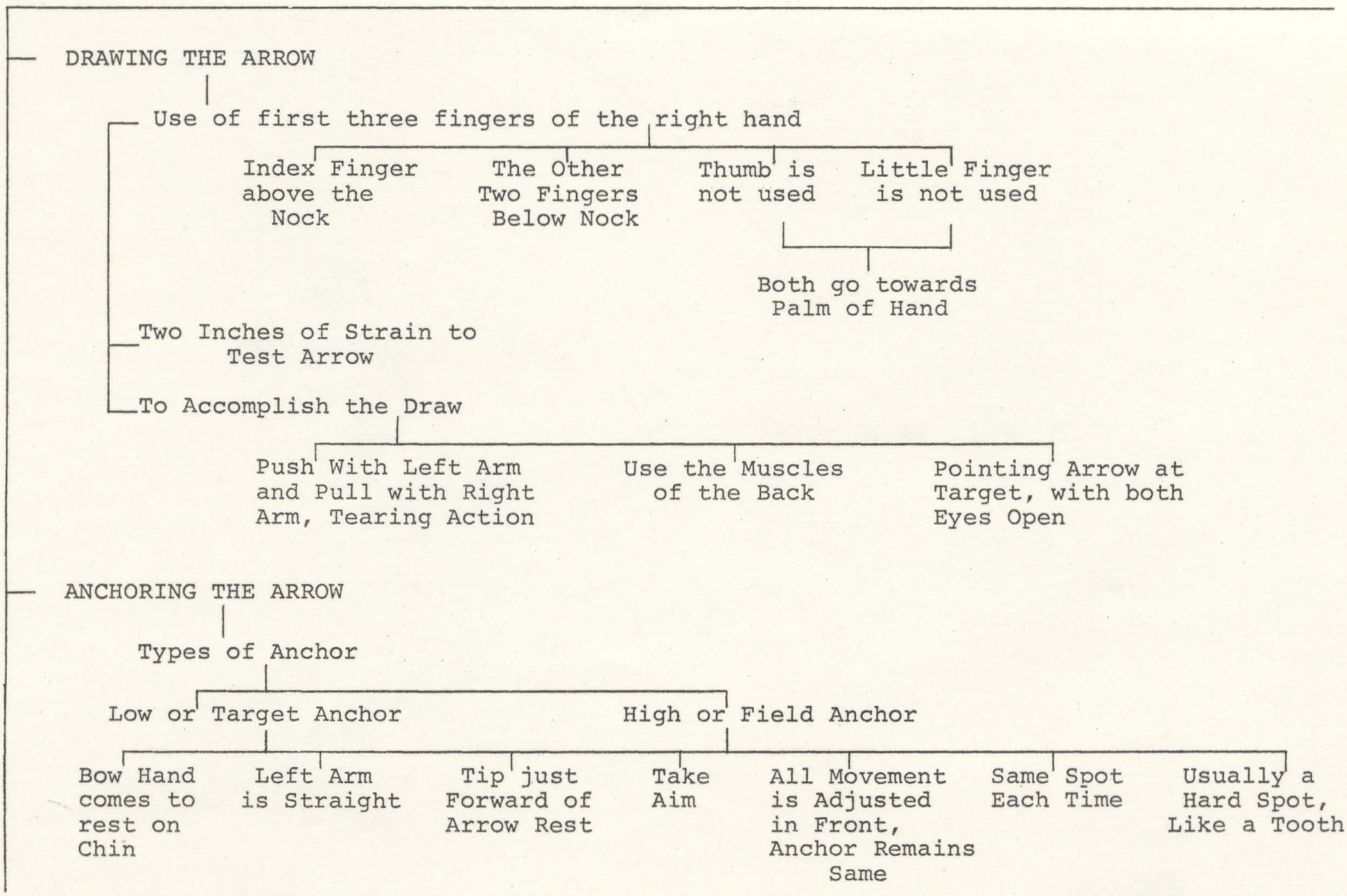
(cont'd.)

Table 3 (cont'd.)



(cont'd.)

Table 3 (cont'd.)



(cont'd.)

TABLE 3 (cont'd.)

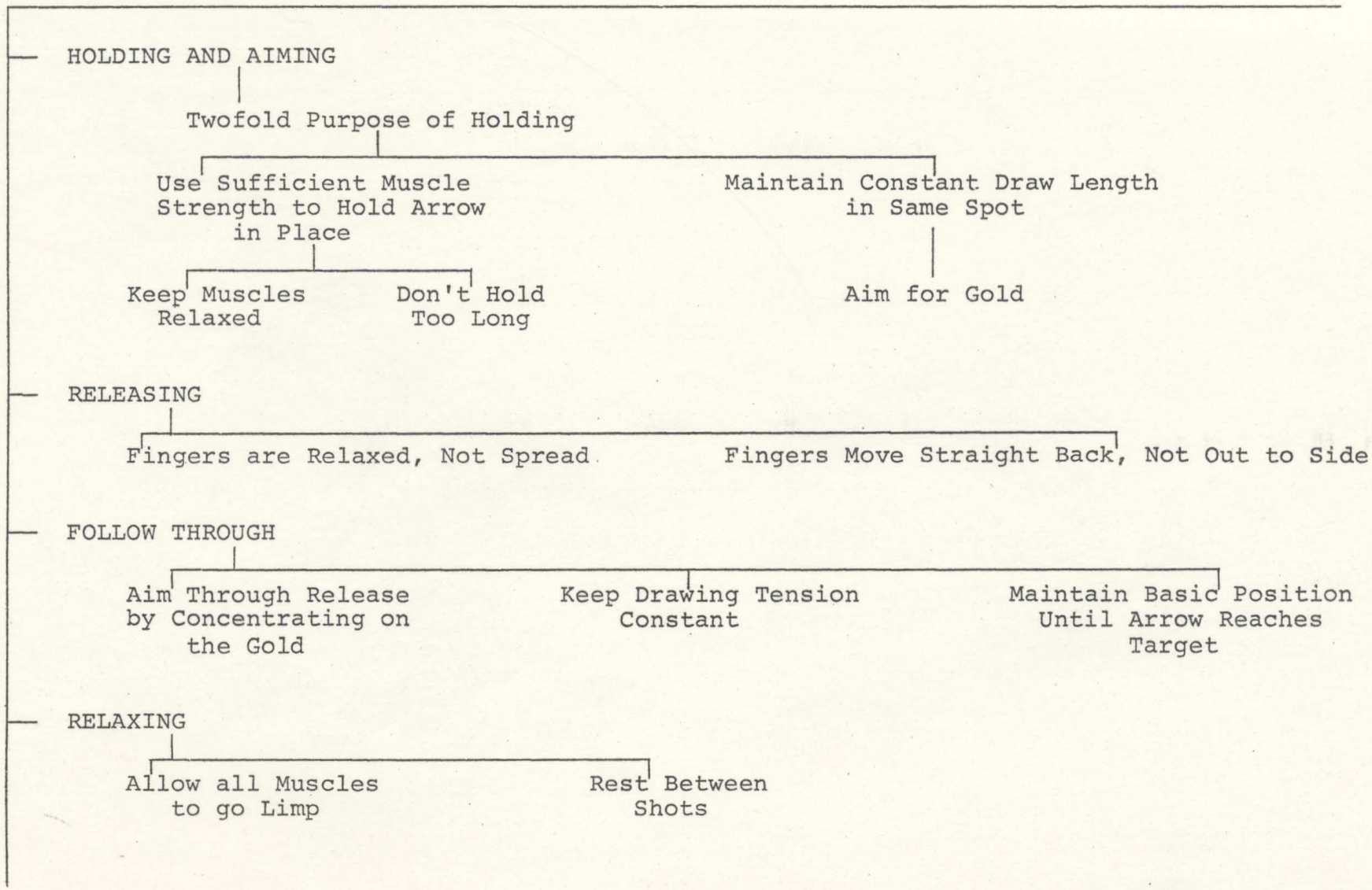
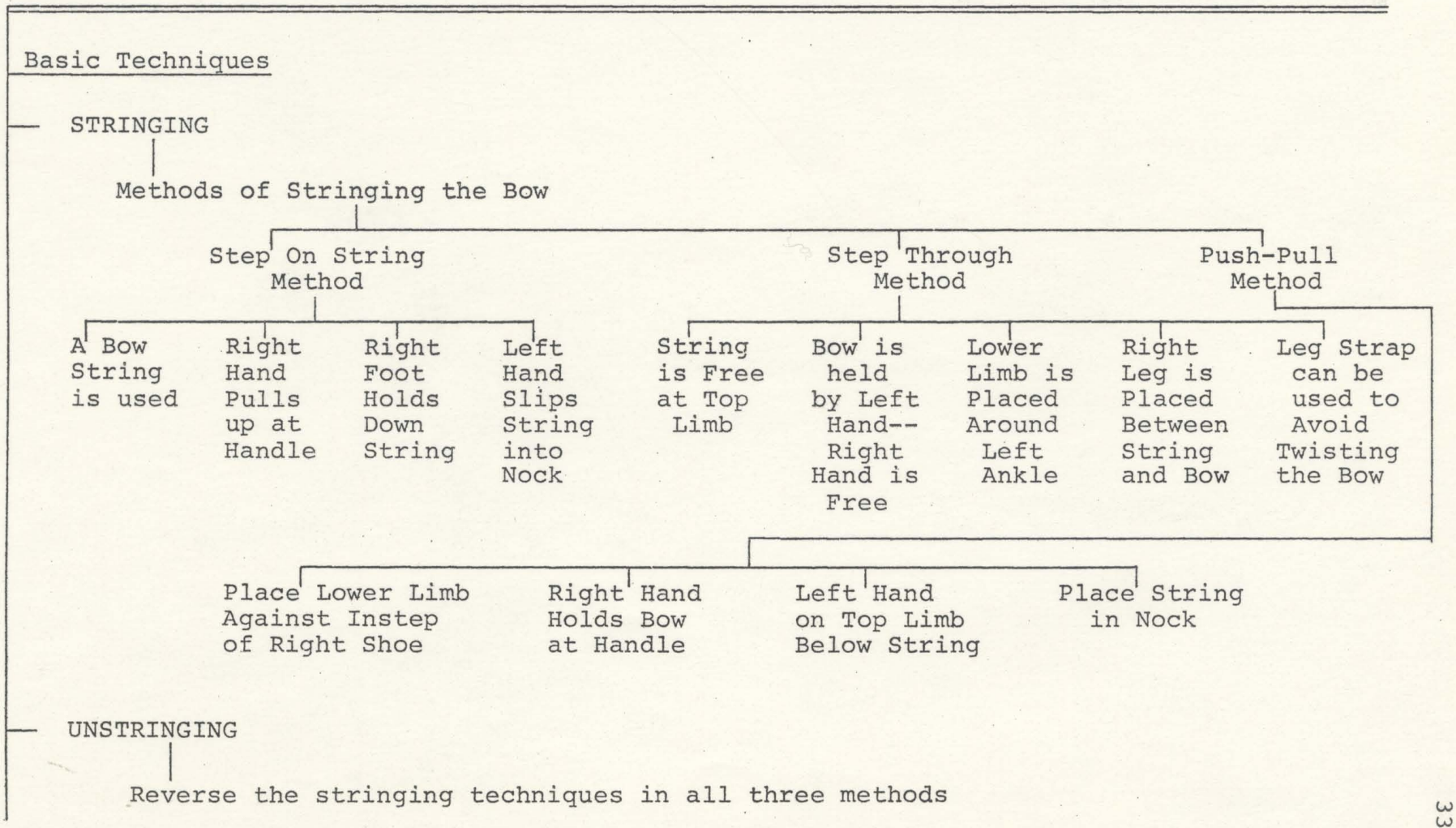


TABLE 4

Task Analysis: Basic Techinques



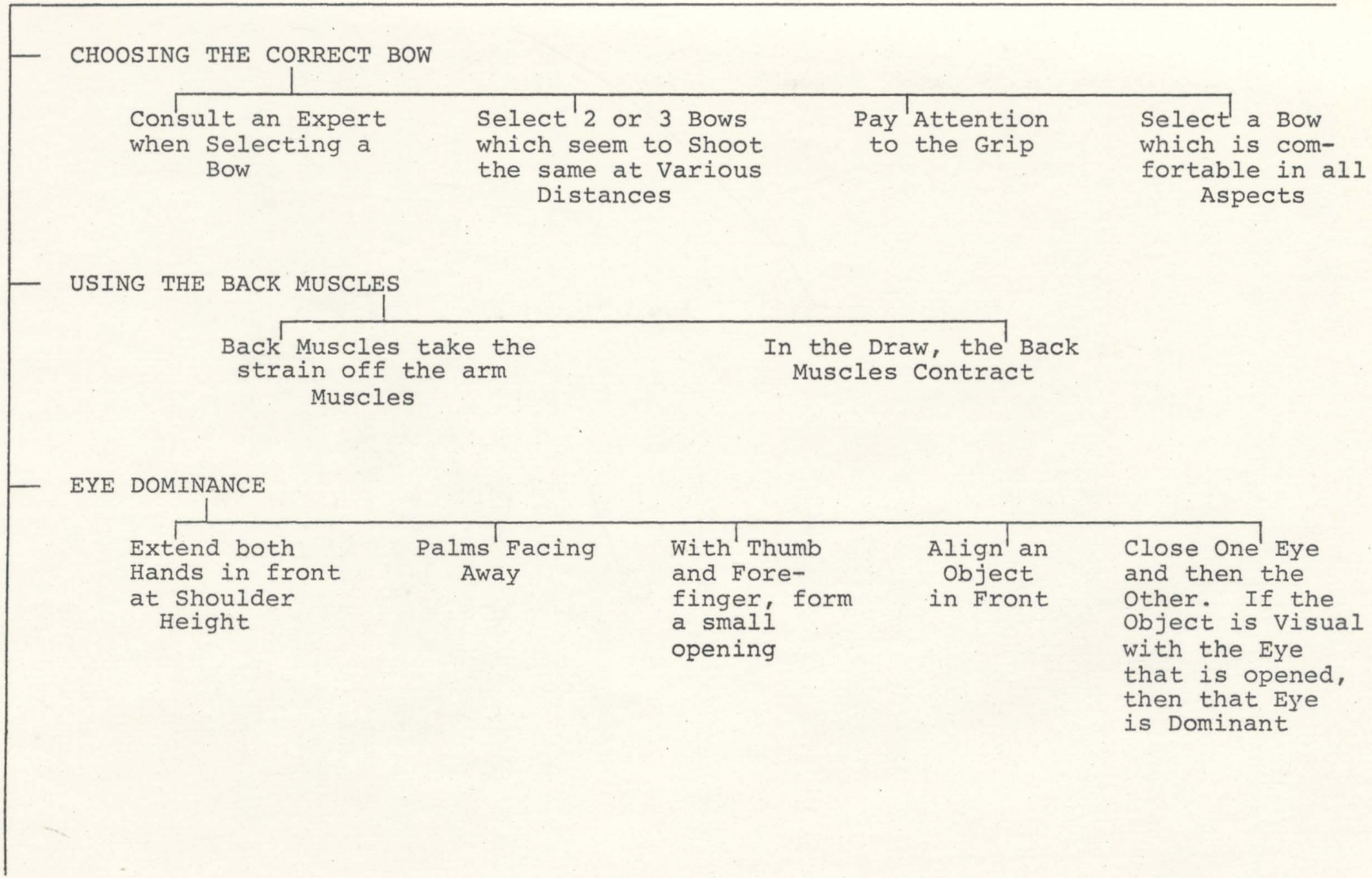
(cont'd.)

Table 4 (cont'd.)

- SAFETY
  - Use Arrows Which are the Correct Length and Never One Which is too Short
  - Never Shoot a Damaged Arrow
  - Never Release a Bow Without an Arrow on it
  - Stringing a Bow Incorrectly Can Cause Trouble
  - Anchor Position of Draw Must Clear Nose or Eyeglasses
  - Loose Clothing must be tied down, or wear a Chest Guard. Never shoot with anything in your Pocket
- MEASURING FOR AN ARROW
  - Put Arrow Nock on the Upper Part of the Chest
  - Extend Arms Straight in Front of You, with Hands Pointed and Palms Facing Each Other
  - The Point on the Shaft where your Finger Tips Reach, is the Correct Arrow Length
- PROPER METHOD USED IN PICKING UP A BOW
  - Pick up the Bow like a Suitcase

(cont'd.)

Table 4 (cont'd.)



trations to guide educators in defining different levels of objectives. He specified three categories of objectives: (i) The Cognitive Domain, (ii) The Affective Domain, and (iii) The Psychomotor Domain. In each of these domains, categories were arranged in hierarchical order from the simplest outcomes to the most complex. For example, the Cognitive Domain began with the simplest knowledge outcomes and proceeded through the increasingly complex levels of comprehension, application, analysis, synthesis and evaluation. The Affective Domain dealt with receiving, responding, valuing and organization. The Psychomotor Domain was concerned with motor skills. This area received major emphasis in art, home economics, industrial education, music, and especially in physical education.

In reviewing Bloom's Taxonomy of Educational Objectives, the developer was able to determine the criteria to be expected for the different levels of the subject areas of the school curriculum. However, for the major purpose of the following paper the Psychomotor Domain was stressed. In developing 'An Introduction to Archery,' which has a set format, the students will concentrate on mastering the purpose, structure and content as outlined in the Task Analysis.

Objectives

The general purpose of the instructional unit was to enable students to identify and explain the various parts of equipment, the basics of shooting and the basic techniques used in archery.

The objective was to enable the students to:

(i) identify two of the four bows used in the videotape production: stick bow, take-down bow for adults; take-down bow for children, hunting bow;

(ii) identify two of the three methods of stringing and unstringing the bow: step-on string method, step-over method and push-pull method;

(iii) identify five of the eight parts of the bow: handle on riser section, handle strap or sling, limbs, arrow rest, sight windows, nock, tip and nocking point on string;

(iv) name the unsafe method of stringing a bow;

(v) identify four of the seven parts of the arrow: shaft, nock, tip or pile, footing, cresting, fletching or feathers, and the index or cock feather;

(vi) name two of the three most common substances which arrows are made of: cedar, fiberglass and aluminum;

(vii) explain the correct method of measuring an arrow;

(viii) explain what will happen if a person chooses an arrow too short for him;

(ix) explain how to hold the bow correctly;

(x) explain how to nock the arrow properly;

(xi) explain the use of the finger tab or glove;

(xii) explain the use of the quiver;

(xiii) explain the use of the arm guard;

(xiv) explain the use of the chest guard;

(xv) choose between a right-handed bow and a left-handed bow;

(xvi) explain, in detail, the stance.

(xvii) explain, in detail, the draw and hold;

(xviii) explain the anchor in shooting an arrow;

(xix) explain the proper way to aim an arrow;

(xx) explain the release and follow through;

(xxi) explain how to release or let down the string without an arrow;

(xxii) explain how the back muscles are used in shooting;

(xxiii) explain how to determine which eye is dominant;

(xxiv) identify three of the seven steps mentioned at the end of the videotape production: grip the bow properly, stance, bow arm extension, nock the arrow, finger placement, draw and hold, and position of the release hand.

Considering the above instructional objectives, it seems important that the choice for a motion medium would enhance the demonstration of the archery materials.

CHAPTER V

RATIONALE FOR CHOICE OF MEDIA

The choice of media for instructional materials arose from the needs assessment, organization of objectives, and the task analysis. The developer investigated the following factors: theoretical considerations and research findings, preferences of teachers and the availability of equipment and cost considerations.

After consideration of each of these factors, the developer decided to use videotape as the medium of instruction. The reason for this decision will be given in the following section.

Theoretical Considerations and Research Findings

Audiovisual Media and Instructions in Sports

There have been several research studies conducted on the effectiveness of using audiovisual techniques for instruction of sports.

Hoban and Van Ormer (1950) summarized research on the use of films for teaching motor skills, and came to the following conclusions: Learners benefit from observing certain motion pictures that illustrate the performance of

certain motor skills; with more complex skills, suitably produced films add significantly to learning when compared with the usual methods of instruction; and the training time required to master the more complex perceptual-motor skills may be considerably reduced by the use of films.

Roshal (1949) concluded that a film is more effective if the task is portrayed from the viewing angle that would be assumed by the learner in performing the task, and that a presentation of the motions involved is more effective than presenting a series of static photographs when a particular motion is important to the procedure.

Yarbrough (1947) made a study of the effectiveness with which motion pictures may be used in teaching skills in beginning field hockey to college women. The results indicated that the use of motion pictures improved the learning of field hockey skills.

Irwin (1958) studied the effect of selected audio-visual aids on teaching beginning tennis skill and knowledge to college women. She concluded that the sound filmstrip method, the silent loop silm method, and the verbal instruction method were equally effective in improving the tennis playing ability and knowledge of college women. It should be noted that in this study all groups were taught essentially the same, with the audiovisual materials used sparingly and without relation to specific skills being practices in sessions following film viewing.

Nelson (1958) used motion pictures and slow motion film loops in teaching golf to adult men and women. Although he discovered no significant difference in learning between the groups using motion pictures and those using slow motion loops, he expressed the opinion that the film loops helped in the pointing out of motor movements which are normally too fast for the eye, and that they were more successful in the later stages of learning.

In three separate studies, Matthews (1971), Weiss (1971), and Smith (1969), no significant difference was found in the ability of college men and women to learn golf when various methods of videotape instruction were compared with teacher-directed instruction.

Mackey (1968) made a study of students' attitudes toward a videotaped course. They were of the opinion that the close-up shots provided a chance to see better than in the usual demonstration and that the screen held their attention better, with fewer distractions than in a regular class. Because the instructor worked with a beginner on the tape, the students could identify with the learner and benefit from his mistakes. They stated as disadvantages, the oversimplification of the tape, the speed (too fast or too slow), the fact that they could not ask questions, and the lack of enforced attention.

Studies of the value of moving pictures and film loops in the teaching of motor skills were reviewed by

Lawther (1968). He concluded that the films are of real value in giving the learner the basic understanding of the action pattern, if the teacher is not thoroughly competent at demonstration; slow-motion pictures will reveal the precise form when the act itself cannot be performed in slow motion, and moving pictures of the learner may help him discover constant errors. On the negative side, he suggests that time which might better be used in physical practice is sometimes wasted in showing moving pictures and that the extensive use of films in the teaching and practice of a motor skill with beginners is of questionable value.

The results from the preceding studies suggested that some students taught by audiovisual instruction techniques do as well as those in control teacher-oriented groups. The limited number of studies conducted in physical education activities, however, makes it difficult or impossible to draw more specific conclusions.

Audiovisual Media and Instructions in Archery

No research studies were found to deal specifically with the suitability of teaching basic archery skills to beginning students by use of audiovisual media. Since the student is the focus of the instructional situation the developer, in keeping with the view of the learner analysis, decided to make the choice of media consistent with providing a stimulus within the learning environment. Cues should be

provided to establish a proper sequence of connections. Although the teacher is the major source of motivation, there are also various forms of the media such as films, tapes, television, flashcards, and workbooks that can provide stimulation for the learner. These inanimate systems can perform their function effectively only when the presentations correspond to the purpose of instruction.

Thus, the instructional objectives have considerable significance for the choice of media for instruction. For example, in teaching a topic in sports, such as 'An Introduction to Archery,' it is necessary for students to be taught with a medium which has moving imagery. Movement enhances teaching of the basic skills in archery: stringing and unstringing the bow; demonstration of the stance; gripping the bow correctly; the draw; the hold; the release; various aiming techniques; and actual arrow flight. An audiovisual medium should use motion to the best of its advantage with structural organization and sequential arrangement of ideas.

On the basis of theoretical considerations, and research findings on audiovisual media, use of either film or videotape would be favourable for instruction in archery. Since most high school students spend many hours each day watching television, thus they have become accustomed to listening and viewing as a single experience. It is therefore felt that the videotape would be an adequate

medium for instructing these students.

Preferences of Teachers

In addition to taking into account theoretical considerations, the developer made a survey of teachers' interests to find their preferences.

The developer, at this stage, sought informally the views of approximately ten physical education teachers with regard to their media preferences. Several questions, concerning various types of audiovisual media for use in instruction in sports, were asked. The majority of those teachers preferred videotape, and this view was supported later in the "informal evaluation stage" (see page 63).

Availability of Equipment and Cost Considerations

It was necessary for the developer to have a sound moving production in order for all the benefits of a sport to be portrayed through a medium: motion (normal speed and slow speed), close-ups, stop action (slides), playback, controlled narration and modelling for the audience. There were two media that could fulfill that requirement. These were motion film (16mm) and videotape.

From the viewpoint of the user the most convenient and accessible media was the 16mm in that it is a common

audiovisual medium to the schools of the province, whereas videotape would be somewhat less available and Super 8 would be almost nonexistent.

However, 16mm was eliminated because it was a difficult and expensive medium to produce, especially with respect to optic sound. From the point of view of production, videotape was the best choice of the three, also multiple copies can be made easily and inexpensively. While there are limitations of the medium for Newfoundland schools, at present there are relatively few videotape machines in the high schools. It is the understanding of the developer that most high school teachers do have access to videotape machines from the school board office or other sources.

The Choice of Media

On the basis of the theoretical considerations and research findings, the preferences of teachers, and the availability of equipment and cost considerations, videotape was the most appropriate choice of media.

CHAPTER VI

DEVELOPMENT PROCEDURES AND FORMATIVE EVALUATION

The videotape production, 'An Introduction to Archery,' was initiated by the author during the fall semester of 1977.

Preparation and Evaluation of Script

Initial Writing of Script

The author initiated the construction of the unit by writing a script for television which was examined by Mr. Len Rich, an expert archer and an archery instructor. The script described archery equipment in detail and the basic information on fundamentals necessary for beginning archers.

Evaluation of Script by Content Specialist

The Content Specialist was Mr. Len Rich, Newfoundland Coach of the 1977 Canada Summer Games Archery Team. Mr. Rich evaluated the script while it was in the form of a storyboard. This storyboard was arranged on numbered index cards. One half of the card contained the proposed narration for the audio, the other half of the card described the scenes for the video.

Mr. Rich suggested a number of recommendations including the following: (i) that the number of students be restricted to two, considering the informal atmosphere of the production, and the proposed individual assistance towards the end of the production; (ii) that the explanation of the whistle and how it is used in competition be included in the production; and (iii) that individual assistance on all aspects of shooting be given to the two students, once they have demonstrated to the instructor their ability and their limitations.

Final Version of Script

The developer made as many changes as were feasible based on Mr. Rich's recommendations. The final version of the script included the following:

(i) Description of the bow;

(ii) Demonstration of stringing and unstringing the bow;

(iii) Description of the arrow;

(iv) Explanation of the arm guard, finger tab, quiver and chest guard;

(v) Demonstration of the stance;

(vi) Demonstration of the shooting of an arrow;

(vii) Explanation and demonstration of the draw and hold, finger placement, the anchor, aiming, and release;

(viii) Demonstration and explanation of dominant eye;

(ix) Explanation of safety procedures;

(x) Individual instructions.

Videotaping and Editing of Program

Videotaping of the Program

The videotape program was produced and directed by the author at St. Clare's Mercy Hospital. In addition, the author prepared the graphics and cue cards. Instruction in the program was provided by Mr. Rich. Assistance for the program was supplied by fellow graduate students and the medical television staff at St. Clare's Hospital.

Evaluation by Media Specialist

The Media Specialist was Doctor Diana Carl, Director of Medical Television at St. Clare's Mercy Hospital. Doctor Carl was an Instructional Developer for television and at the time was producing videotape programs for St. Clare's.

After previewing the instructional unit in it's initial stages, the Media Specialist suggested ways of improving the final product: (i) insertion of slides to enhance close-up scenes, (ii) a beginning introductory statement for the audience, to prepare them for what is to follow, (iii) a concluding statement, presenting the main points of the program as a resume, and (iv) editing out certain portions of the production which were not necessary.

Doctor Carl stated that her overall impression of the finished production was favourable.

Editing of Program

The videotape was edited by the author at Memorial University's Extension Services where slides and Super 8 film were incorporated into the program.

Evaluation by Learning Specialist

After the editing procedures were made, the videotape was evaluated by the Learning Specialist. The Learning Specialist was Mr. Wayne Lundrigan, President of the Avalon Archery Club. Mr. Lundrigan had been instructing archery in St. John's for five years. He had a Level Two Coaching Certificate in archery and had served on various committees for the National Archery Association of Canada.

The Learning Specialist previewed the videotape and discussed it with the developer. Subsequently, he submitted a written account of his reactions, stating that he had no negative comments and approved the instructional unit as it was presented (see Appendix C).

Evaluation by Media Specialist

After editing took place the Media Specialist made the following observations: (i) that some of the slides were not as precise, in their demonstration and clarification

of a topic, as they should be, (ii) that the jump cuts be eliminated in the production, (iii) that the sequence showing the dominant eye needed improvement, (iv) that the demonstrator in the slides should have worn different colored clothes to contrast the background and this also needed improvement, (v) that the last sequence of arrows going into the target was too dark and not clear, therefore, it detracted from the effect of the program.

The developer agreed with these recommendations but it was decided that the degree of improvement did not justify the additional time required to make those suggestions.

After the changes were made to the production, it was ready for formal evaluation.

CHAPTER VII

SUMMATIVE EVALUATION

After the Formative evaluation was completed, the Summative evaluation was carried out. It was conducted using a selected group of grade ten students at Gander, Newfoundland.

Procedure

Instructions were directed by the physical education teacher at the school. The developer sent out the instructional unit by mail to Gander and did not become directly involved in the administering of the videotape program.

The testing procedure implemented was pretest--treatment--posttest. This method was used because of the comparative simplicity, as all communication concerning the unit was done through the mail. This method also supplied a sound basis on which to interpret results.

Development of Pretest-Posttest

The pretest and the posttest, which were identical, were designed to correspond to the instructional objectives of the Learning Unit (see Table 5). The test consisted of

TABLE 5

A Comparison of Test Questions and Instructional Objectives

Instructional Objectives	Test Numbers
(i)	28, 29, 30, 31
(ii)	5, 11
(iii)	28, 29, 30, 31
(iv)	5
(v)	7, 32, 33, 34, 35
(vi)	2
(vii)	10
(viii)	10
(ix)	17
(x)	23, 28
(xi)	4, 13
(xii)	8
(xiii)	1
(xiv)	9
(xv)	18, 25
(xvi)	6, 26
(xvii)	12, 13, 15, 16, 22, 24
(xviii)	12, 15, 20, 27
(xvix)	14, 15, 23, 27
(xx)	3, 15, 19, 24
(xxi)	24
(xxii)	22
(xxiii)	18, 25
(xxiv)	3, 6, 13, 15, 16, 17, 19, 20, 21, 22, 23, 24, 26, 27

seventeen multiple choice questions, nine true-false questions, four matching questions, and five long answer questions (see Appendix A).

The test was subjected to examination for face validity by ten physical education teachers, five classroom teachers and five archery instructors. According to Good (1959), "face validity" means that the test contains apparent value for a given purpose.

In the opinion of the physical education teachers, the test items reflected the stated objectives of the unit; in other words, it could be assumed that students who successfully answered the test items had achieved the objectives.

Selection of Sample Students

In the judgement of the physical education teacher who conducted the evaluation, the grade ten class was representative of the group of students which were described in the Learner Analysis (see page 19).

Administration of Pretest

The physical education teacher introduced the Instructional Unit with no previous instruction. He then administered the pretest to the students. The pretest was conducted to determine what level of achievement and knowledge the students had reached in archery.

Presentation of Instructional Materials

Immediately after the pretest was collected by the physical education teacher, the videotape, 'An Introduction to Archery,' was shown to the students. The only information the students received in archery was from the videotape itself.

Administration of Posttest

After the videotape was presented to the students, the posttest was administered. The posttest was conducted to determine how much information the students had received from the showing of the videotape.

The videotape, the pretest, and the posttest were mailed back to the developer who analyzed the results.

Analysis of Results

Results of the tests were tabulated in the following three ways: (i) Comparison between mean scores on pretest and posttest, (ii) a Percentage Analysis, and (iii) an Item Analysis.

Comparison Between Mean Scores on Pretest and Posttest

The means of the scores on the pretest and on the posttest were compared, and the difference was subjected to a *t*-test of significance. The results are shown in Table 6.

TABLE 6

Comparison of Mean Scores on Pretest and Posttest

PRETEST		POSTTEST		DIFFERENCE BETWEEN MEANS		
Mean	SD	Mean	SD	t-test	df	Level of Significance
32.9	11.21	59.9	13.52	13.55	19	$p < .001$

As demonstrated in Table 6, with a mean score on the pretest of 32.9 and a mean score on the posttest of 59.9, the scores on the posttest were significantly higher than those on the pretest. It is evident, then, that the class as a whole increased significantly their knowledge of archery.

Percentage Analysis

The purpose of the Percentage Analysis was to examine what percentage of students attained a given level of achievement, whereby that level of achievement was calculated by percentage of items correct. This was analyzed on a cumulative basis. The results are shown in Table 7.

The results of the Percentage Analysis is somewhat lower than the developer would have liked but considering the results of other analyses, it was considered acceptable.

TABLE 7

Percentage of Students With Percentage of Items Correct on Their Posttest Scores

Students	Scores
10%	75% or more
25%	70% or more
35%	65% or more
50%	60% or more
70%	55% or more
75%	50% or more
25%	less than 50%

Item Analysis

An Item Analysis was conducted to determine a success ratio for each item. To determine the success ratio for each item, the following data were calculated: (i) the total number of failures on the pretest; (ii) the number of students who failed on the pretest but succeeded on the posttest, and (iii) the number of students who failed on the pretest and failed on the posttest.

The success ratio is taken to be that proportion of the total failures on the pretest who passed on the posttest. There were twenty students tested. The results are shown in Table 8.

TABLE 8

Item Difficulty Determined by Percentage of Correct and Incorrect Responses

Item	Total Wrong on Pretest Col. (1)	No. Wrong on Pretest, right on Posttest Col. (2)	No. Wrong on Pretest, wrong on Posttest Col. (3)	Success Ratio Col. (2) ÷ Col. (1)
1	1	1	0	1.00
2	14	13	1	.93
3	11	8	3	.73
4	8	6	2	.75
5	17	11	6	.65
6	17	9	8	.53
7	10	8	2	.80
8	14	11	3	.79
9	19	17	2	.89
10	14	9	5	.64
11	4	3	1	.75
12	6	3	3	.50
13	8	6	2	.75
14	10	9	1	.90
15	5	3	2	.60
16	6	6	0	1.00
17	17	15	2	.88
18	6	4	2	.67
19	4	2	2	.50
20	8	6	2	.75
21	5	3	2	.60
22	16	9	7	.56
23	18	14	4	.78
24	19	10	9	.53
25	6	6	0	1.00
26	11	8	3	.73
27	10	9	1	.90
28	8	4	4	.50
29	14	7	7	.50
30	5	4	1	.80

The results of the Item Analysis were favourable in that the majority of the students tested showed an increase in the posttest scores for each item.

Additional Evaluation

A brief questionnaire was composed by the developer and completed anonymously by potential physical education teachers of Memorial University. These students viewed the videotape production, 'An Introduction to Archery,' and subjectively answered the questionnaire on the videotape's ability to assist an instructor in teaching archery (see Appendix B).

Most of the students' comments concerning the videotape production were favourable, including such comments as "very informative," "pretty good," "good information," "extremely useful," and "a valuable instructional aid." The few negative comments were concerned mainly with the technical difficulties of the videotape, including timing between shots and vibrations of the picture on the screen. Some students also expressed the view that the information contained in the videotape was somewhat lengthy. Other students wanted to review the instructional unit several times, stopping the videotape and having certain pertinent details pointed out to them, while others felt a need to accompany the unit with practical experience.

All of the students identified the videotape as being easily understood. The speed of instruction was just right for 85 percent, while 15 percent found it too fast. While 65 percent of the students expressed that the clarity of instruction was just right, 35 percent found it to be very easily understood.

Ninety percent of the students felt the quantity of information given in the videotape was adequate, while 10 percent thought there was too much information presented. Five percent of the group felt that the unit was boring, 5 percent found it very interesting, and 90 percent found the videotape interesting.

A large majority of the students identified the videotape as being useful for themselves and others as an aid to teaching archery. Other responses are shown in Table 9. A choice of 2 to 3, shown in Table 9, indicated to the author that there was a strong representation for the videotape as a suitable analysis for its instructional ability.

Fifty percent of the students preferred learning through the videotape unit alone, while 10 percent preferred the videotape plus instructor. The remaining students indicated a preference for book alone (10%), book plus instructor (5%), slides (10%), Super 8 film (5%), instructor plus book (10%).

The results of the questionnaire for potential physical education teachers have been arranged according to

TABLE 9

Results of Reaction Questionnaire

Items	% Scale and Range 1	2	3	4
1. Quantity of Information	Too Much N = 20 % 10	35	55	Too Little 0
2. Interest	Boring N = 20 % 5	65	25	Very interesting 5
3. Aid to Teaching Archery	Much Help N = 20 % 35	35	30	No Help 0
4. Speed of Instruction	Too Fast N = 20 % 15	40	45	Too Slow 0
5. Degree of Difficulty	Too Easy N = 20 % 0	40	60	Too Difficult 0

(cont'd.)

Table 9 (cont'd.)

Item	% Scale and Range 1	2	3	4
6. Clarity of Instruction on Tape	Easily Understood N = 20 % 35	40	25	Difficult to Follow 0
7. Usefulness of Tape for Person	Very Useful N = 20 % 45	30	25	Not Useful 0

	Videotape		Book		Slides	Super 8	Other
	Alone	Plus Instructor	Alone	Plus Instructor			
8. Choice of Medium for Presentation	50%	10%	10%	5%	10%	5%	10%

Note. N = 20 = number of students who answered all questions.

percentages in Table 9.

Limitations

The production of the videotape had certain limitations. Some of these limitations were: (i) high school students are accustomed to being taught by teachers and not by programs, (ii) the videotape program was played for the total time of twenty-six minutes; at no time was the production stopped and no questions were asked by the students, and (iii) the students did not practice with the archery equipment during instruction by videotape, and they were tested only from the visual experience of the tape, in the posttest.

Conclusion

The Instructional Package was appropriate for the group to which it was presented. The pretest demonstrated that very few students had previous exposure even to the terminology used in the videotape. Having participated in the learning experience, considerable gains in familiarity with the terminology were evident. The overall results tend to support the use of the videotape production as an instructional device. Also, through observation and informal discussion with the students after the pretest, it was

recorded that the participants enjoyed the concise, factual approach to instruction, and also the method of actually being instructed in a new sport by videotape was interesting.

The results of the questionnaire administered to potential physical education teachers demonstrated that they found the videotape instruction favourable and informative. Also, if they were teaching a new sport to beginners, use of videotape would be their first choice in the majority of cases.

It can reasonably be concluded that the videotape production achieved the general objectives which were established by the developer (see page 37). A commentary by the Learning Specialist reiterated this fulfillment. He expressed the opinion that the videotape production, 'An Introduction to Archery,' "would save many hours of lecturing and demonstrations" and "avoids confusion on the part of the audience." Also, he stated that "the videotape is a valuable asset for any archery instructor" (see Appendix C). The videotape, then, fulfilled the general purpose for which it was intended.

CHAPTER VIII

CONCLUSION, RECOMMENDATIONS, IMPLEMENTATION

Conclusion

The purpose of the developmental project was to prepare a videotape to be used in an introductory class in archery, to enable the students to identify and explain the various parts of equipment, the basics of shooting and the basic techniques.

The videotape production, 'An Introduction to Archery,' has been shown to be a successful method of teaching beginning archers. A large proportion of the subjects (both students and potential physical education teachers) reported generally favourable attitudes toward their experience with the production during the investigation (questionnaire and informal conversation).

Based on the project herein described, it appears feasible to incorporate a combination of various media into a television format to teach introductory skills in athletics.

This project tends to confirm that demonstration by videotape for teaching beginning motor skills provides a uniform and controlled presentation. It suggests further that when demonstrations by a skilled instructor are not

available, demonstrations through videotape constitute a reasonable substitution.

Recommendations

The following recommendations are made for further research and applications for teachers who could find the author's method of presentation to be beneficial:

(i) A similar videotape should be prepared for advanced archers commencing where this production ended.

(ii) Future videotapes produced by local physical education teachers, involving various sports, should be undertaken to further stimulate the physical education curriculum in Newfoundland.

(iii) To determine whether these findings are adaptable to other subject areas, studies should be conducted in other areas of the curriculum, and at other grade levels.

(iv) A study should be undertaken to determine if there is a lack of literature and available audiovisual materials concerning other new sports in the physical education curriculum in Newfoundland.

Implementation

This program has been developed for the physical education curriculum in Newfoundland high schools. It was designed to assist physical education teachers or archery

instructors at a recreational level, so that beginning archers could receive adequate instruction in the fundamentals of archery.

It is suggested by the developer that the videotape production be viewed in its entirety at the start of the physical education teaching unit. The proposed teaching unit at a high school level will consist of twelve lessons or a six-week block of time. At the beginning of each lesson the appropriate sections of the videotape will be shown.

In addition, copies of this videotape production will be made available to Resources, Clearing House, Faculty of Education, Memorial University of Newfoundland. Physical education teachers and archery instructors will be made aware of the existence of this production. Copies will be made on request for archery clubs in Newfoundland. Also, this videotape could be used to supplement archery clinics and workshops throughout the province.

BIBLIOGRAPHY

Addison, C.F. Effects of variations of target size, distance, and shooting technique on archery performancy by college women beginners. Unpublished doctoral dissertation, Temple University, 1972.

Bear, F. The archer's bible. New York: Doubleday & Company, 1968.

Bloom, B.S. Taxonomy of educational objectives. New York: David McKay Company, Inc., 1966.

Burke, E.H. Archery. New York: Arc Books, 1963.

Clark, J.F. A comparison of individualized and conventional methods for teaching archery in high school. Unpublished doctoral dissertation, University of Southern Mississippi, 1976.

Coleman, J.S. The adolescent society: The social life of the teenager and its impact on education. New York: Free Press, 1960.

Dauer, V.P. Dynamic physical education for elementary school children. Washington: Burgess Publishing Company, 1971.

Driscoll, M.L. Selected archery articles, sports articles reprint series. Washington: American Association for Health, Physical Education, and Recreation, 1971.

Forbes, T.A. New guide to better archery. Harrisburg, Pennsylvania: The Stackpole Company, 1960.

Frey, S.H., & Haugen, E.S. Readings in classroom learning. New York: American Book Company, 1969.

Genge, R. Basic archery manual. St. John's: Newfoundland and Labrador Amateur Sports Federation, N.D.

Gillelan, G.H. Complete book of the bow and arrow. Harrisburg, Pennsylvania: The Stackpole Company, 1977.

Goldman, H. The effect of variations of methods of shooting and of distance on the achievement in archery for male college beginners. Unpublished doctoral dissertation, Indiana University, 1962.

Good, C.V. Dictionary of education. New York: McGraw Hill, 1959.

Hammond, C.R. The construction and standardization of an archery knowledge test for college students. Unpublished doctoral dissertation, Temple University, 1954.

Harrison, J.M. A comparison of a videotape program and a teacher-directed program of instruction in teaching the identification of archery errors. Unpublished doctoral dissertation, Brigham Young University, 1973.

Haugen, A., & Metcalf, H. Field archery and bow hunting. New York: The Ronald Press Company, 1963.

Heath, E.G. The grey goose wing. Berkshire: Osprey Publications Ltd., 1971.

Heath, E.G. A history of target archery. Newton Abbot: David & Charles, 1973.

Heath, E.G. Better archery. London: Kaye & Ward, 1976.

Hoban, C.F., & Van Ormer, E.B. Instructional film research, 1918-1950. Instructional film research program. Pennsylvania State University, 1950.

Hochman, L. The complete archery book. New York: Arco Publishing Company, 1957.

Hougham, P.C. The encyclopedia of archery. New York: A.S. Barnes and Company, 1958.

Hoyt, E. Archery. Chicago: The National Archery Association, Inc. of the United States, 1972.

Irwin, J. The effect of selected audiovisual aids on teaching beginning tennis skill and knowledge to college women. Unpublished doctoral dissertation, Indiana University, 1958.

LaFollette, J.J. The effect of video feedback and demonstration film loops on learning basic archery skill. Unpublished doctoral dissertation, Indiana University, 1969.

Lawther, J.D. The learning of physical skills. New Jersey: Prentice-Hall, Inc., 1968.

Leah, B. The effects of instant videotape feedback in learning target archery. Unpublished doctoral dissertation, University of Southern Mississippi, 1973.

Longman, C.J., & Walrond, H. Archery. New York: Frederick Ungar Publishing Company, 1894.

Lowe, B. The beauty of sport: A cross-disciplinary inquiry. New Jersey: Prentice-Hall, Inc., 1977.

Mackey, R.T. Sports skills lessons on television. Journal of Health, Physical Education and Recreation, 1968, 39, 31-32.

Malmud, N.R.B. The effect of knowledge of specific performance standards for grade achievement on the archery performance of community college students. Unpublished doctoral dissertation, New York University, 1974.

Matthews, E.L. The effectiveness of videotape replay as an adjunct in teaching the golf swing. Unpublished doctoral dissertation, University of Utah, 1971.

McKinney, W.C. Archery. Iowa: W.C. Brown Co., 1966.

Miller, A.G., & Whitcomb, V. Physical education in the elementary school curriculum. New Jersey: Prentice-Hall, 1969.

National Archery Association. The archer's handbook. Ronks, Pennsylvania: The National Archery Association, Inc. of the United States, 1968.

Nelson, D.O. Effect of slow-motion loopfilms on the learning of golf. Research Quarterly, 1958, 29, 37-45.

Niemeyer, R.K. Beginning archery. Belmont, California: Wadsworth Publishing Co., 1967.

Roshal, S.M. Effects of learner representation in film-mediated perceptual-motor learning. Instructional Film Research Program, Pennsylvania State University, 1949.

Schuette, F.J. Case study of a continuing education program in a leisure skill: The archery segment of the outdoor education project of the American Alliance for Health, Physical Education and Recreation. Unpublished doctoral dissertation, Michigan State University, 1973.

Smith, B.B. The effectiveness of television videotape instant playback in learning the pitch and run shot in golf. Unpublished doctoral dissertation, University of North Carolina, 1969.

Sullivan, G. Better archery for girls and boys. New York: Dodd, Mead, 1970.

Ulrich, R.P. The effect of hypnotic and nonhypnotic suggestions on archery performance. Unpublished doctoral dissertation, University of Utah, 1973.

Vannier, M., & Poindexter, H.B.W. Individual and team sports for girls and women. Philadelphia: W.B. Saunders, Company, 1976.

Vannier, M., & Fait, H.F. Teaching physical education in secondary schools. Philadelphia: W.B. Saunders Company, 1964.

Van Uliet, M.L. Physical education in Canada. Scarborough, Ontario: Prentice-Hall of Canada, Ltd., 1965.

Voltmer, E.F., & Esslinger, A.A. The organization and administration of physical education. New York: Meredith Publishing Company, 1967.

Weiss, E.S. The value and use of instructional television in teaching women beginning golfers. Unpublished doctoral dissertation, Arizona State University, 1971.

Williams, J.C. Archery for everyone. Chicago: Regnery, 1976.

Yarbrough, E.I. A study of the effectiveness with which the motion picture may be used in teaching undergraduate college women skills of beginning field hockey. Unpublished master's thesis, Texas State College for Women, 1947.

APPENDICES

APPENDIX A

PRETEST, POSTTEST

INTRODUCTION TO ARCHERY TEST

Name _____

Grade _____

Age _____

Sex _____

Any previous archery experience yes ___ no ___

If yes, briefly describe it _____

_____

_____

_____

Part I

Directions: Select the one item which best answers the question.

(1) An arm guard is used:

(a) only by beginners
(b) to keep the string from wearing
(c) only in cold weather
(d) to protect the forearm

(2) Which one of the following materials is not used for making arrows:

(a) fiberglass
(b) bamboo
(c) aluminum
(d) cedar

(3) In release, the:

(a) fingers should be definitely extended
(b) fingers should be allowed to just relax back off the string
(c) hand should come away from the face
(d) fingers should tingle at the tips.

(4) Which one of the following objects is used on the drawing hand:

(a) Quiver
(b) Finger Tab
(c) Fletching
(d) Shaft

(5) Which one of the following ways of stringing the bow is considered the most unsafe method:

(a) step-on string method
(b) step-over method
(c) push-pull method

(6) In shooting, the archer shall stand:

(a) with his feet behind the shooting line
(b) with his feet on the shooting line
(c) any place on the line within his target markers
(d) with his feet on either side of the shooting line.

(7) The fletching on an arrow:

(a) is another name for the nock
(b) is the distinction lines
(c) is another name for the feathers
(d) lies just behind the tip

(8) Which one of the following objects is used to hold the arrows while not shooting:

(a) arrow stand
(b) quiver
(c) shaft
(d) quilt

(9) Which one of the following is not worn by the archer:

(a) arm guard
(b) wrist strap
(c) quiver
(d) chest guard

Part II

Directions: Circle TRUE or FALSE to the following statements:

T F (10) It is considered dangerous to shoot an arrow that is too long for a given bow.

T F (11) In stringing a bow, it is necessary to distribute the bend or strain equally on both ends.

T F (12) The finger muscles are not to be used when drawing the string to the anchor point.

T F (13) It is better to use four fingers when drawing the bow, that is, if the bow is larger than one you are used to.

T F (14) The archer will have a more accurate estimate of distance if he sights with both eyes open.

T F (15) The archer who shoots quickly will be more consistent than the one who holds.

T F (16) Pinching the arrow will make drawing back the string easier.

T F (17) The bow should be gripped tightly by the whole hand so as to keep it steady for the shot.

T F (18) There is no difference between a right-handed bow and a left-handed bow.

Part III

Directions: Match column B with column A by placing the letter from column A in front of the questions in column B.

Column A

(a)	free style	(e)	relax
(b)	instinctive	(f)	right
(c)	rear sight	(g)	velocity
(d)	forearm	(h)	back

Column B

Example:

(a) 1. A sight is used with this method of shooting?

(19) To release the string we allow the fingers to do what?

(20) What are the two most important reasons for a consistent anchor point?

(21) The arrow forms what angle with the string?

(22) We use these muscles to relieve the pressure on the drawing arm.

Part IV

Answer completely.

(23) List five basic steps in shooting an arrow.

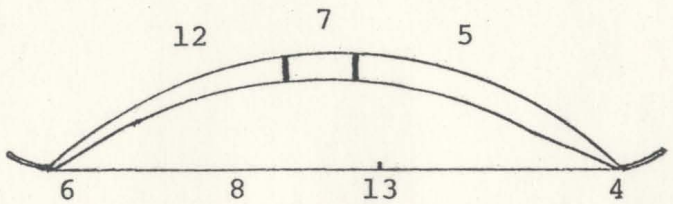
(24) Describe the action of the drawing hand upon release and follow through.

(25) How can you determine if you should be shooting right- or left-handed?

(26) Describe fully the stance used in archery.

(27) Describe fully the anchor point.

Part V



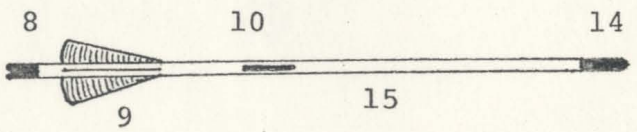
Directions: Items 28 through 31 refer to the diagram above. The parts of the bow listed below correspond to a number in the diagram.

(28) The nocking point is: (1) 4 (2) 13 (3) 6 (4) 7

(29) The riser section is: (1) 5 (2) 12 (3) 7 (4) 6

(30) The tip is: (1) 13 (2) 7 (3) 4 (4) 12

(31) The limb is: (1) 12 (2) 7 (3) 13 (4) 8



Directions: Items 32 through 35 refer to the diagram above. The parts of the arrow listed below correspond to a number in the diagram.

(32) The fletching is: (1) 9 (2) 8 (3) 10 (4) 14

(33) The nock is: (1) 14 (2) 10 (3) 8 (4) 9

(34) The pile is: (1) 10 (2) 9 (3) 14 (4) 8

(35) The shaft is: (1) 14 (2) 8 (3) 9 (4) 15

APPENDIX B

QUESTIONNAIRE

QUESTIONNAIRE FOR INSTRUCTORS OF ARCHERY

Now that you have seen the videotape, 'An Introduction to Archery,' would you please answer the following questions (on a scale of 1 - 4)?

As an Instructor of Archery I found the tape:

(1) Quantity of Information:

Too much	1	2	3	4	Too little

(2) Interest:

Boring	1	2	3	4	Very interesting

(3) Aid to Teaching Archery:

Much help	1	2	3	4	No help

(4) Speed of Instruction:

Too fast	1	2	3	4	Too slow

(5) Degree of Difficulty:

Too easy	1	2	3	4	Too difficult

(6) Clarity of Instruction on Tape:

Easily understood	1	2	3	4	Difficult to follow

(7) If you were to teach Archery, would you find the tape useful:

Very useful	1	2	3	4	Not useful

(8) From your experience would this material best be presented by:

Book	Videotape	Slides	Super 8	Other
____	____	____	____	____

(9) General Comments:

_____

_____

_____

_____

_____

_____

APPENDIX C

LETTER

279 Freshwater Road
Apartment 95
St. John's, Nfld.

October 10, 1978

Dr. G. Fizzard
Director of Learning Resources
Memorial University of Newfoundland
Elizabeth Avenue, St. John's, Nfld.

Dear Dr. Fizzard:

Recently I was very fortunate in being able to view the video tape production "An Introduction to Archery". I feel this film ranks as one of the most important contributions to the sport of Archery for many years, and I feel it will be acclaimed by instructors and coaches in every province in Canada.

Where Archery is not a spectator sport, it hasn't been exposed to the public and most people think of it as they see it in the western movies. This video tape has a tremendous promotional value because it shows the advanced stages of Archery using sophisticated equipment.

As well as the promotional aspect of this production, it is a complete instructional package touching all the bases in the area of equipment and actual shooting for beginners. Each piece of information is introduced in its proper sequence thus avoiding confusion for the viewer.

Any Archery Club would be very fortunate to have the opportunity of using this video tape production in their Archery classes as it would save many hours of lecturing and demonstrations.

Yours truly,

Wayne Lundrigan

Wayne Lundrigan
President
Avalon Archery Club

APPENDIX D

VIDEOTAPE: "AN INTRODUCTION TO ARCHERY"

(under separate cover)